

**WRITTEN TESTIMONY OF:**

***Susan M. Cischke***

*Vice President of Environmental and Safety Engineering*

*Ford Motor Company*

***House Subcommittee on Energy and Air Quality***

***"Vehicle and Fuels Technology: Next Generation"***

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## MEMBERS OF THE COMMITTEE:

My name is Susan Cischke and I am the Vice President of Environmental and Safety Engineering at Ford Motor Company. Energy security is a significant issue facing our nation, and the role of the next generation of vehicles and fuels is of great importance to the auto industry. I appreciate the opportunity to share with you Ford Motor Company's views on this issue.

Energy is literally the fuel that powers the industrial and manufacturing growth of the United States. The energy supply disruptions of last summer, increases in global demand, and geopolitical concerns with some of the oil rich regions of the world led to significantly higher energy prices and consumer angst at the fuel pump. It's our view that action must be taken in all sectors, if we are to meet these challenges as a nation.

At Ford, we recognize that we have a responsibility to do something to help address America's energy security needs, and we are accelerating our efforts to develop innovative solutions. As Bill Ford has said, "Ford Motor Company is absolutely committed to making innovation a central part of everything we do." That innovation begins with alternative fuels and vehicles. Ford produced the first American hybrid on the road today – the Ford Escape Hybrid. We have committed to building up to a quarter-million hybrids a year by 2010 and to continue our leadership in ethanol powered flexible fuel vehicles.

These new product initiatives are a strong commitment for Ford and our customers, and they recognize a changing marketplace. But there is a limit to what we can achieve on our own. We believe that our nation's energy challenges can only be properly addressed by an Integrated Approach: that is, a partnership of all stakeholders which includes the automotive industry, the fuel industry, government, and consumers. The truth is that we must all accept that these are long-term challenges and that we are all part of the solution.

So let me set out how we at Ford Motor Company believe each stakeholder can play its part. I'll start with the automotive industry itself, because we clearly have a central role to play. The industry has taken significant steps in improving the fuel efficiency of our products. At Ford Motor Company we see this not only as being socially responsible but a business necessity, and we are moving ahead with a range of technological solutions simultaneously – because there is simply no single solution, no “silver bullet”. We know that when customers consider purchasing a vehicle, they are concerned with numerous attributes including price, quality, safety, performance, comfort and utility.

From our perspective, no one factor can be ignored in the highly competitive U.S. marketplace. As a result, we are working to accelerate the commercial application of all areas of advanced vehicle technologies, including hybrids, flexible fuel vehicles, advanced clean diesels, hydrogen-powered internal combustion engines and fuel cell vehicles.

The portfolio approach that we are taking ensures that we are able to offer consumers a range of products that meet their specific needs and circumstances. And make no mistake; it will ultimately be the consumers who decide.

This diversity of customer needs within and across markets is why we are investing in a portfolio of solutions. The result is a period of unprecedented technological innovation. Innovation – in matters of the energy, renewable fuels, safety and design – is the compass by which we are setting our direction for the future. At Ford, we recognize that hybrids have an important place within this portfolio of solutions. They deliver excellent benefits in lower speed stop/start traffic and offer many customers breakthrough improvements in fuel economy – up to 80% in city driving – without compromise. And much of this technology is also applicable to our fuel cell and ethanol vehicle development efforts.

In 2004, we launched the world's first gasoline-electric full hybrid SUV, the Escape Hybrid. In 2005, we expanded this technology to the Mercury Mariner Hybrid, and have announced plans to offer this technology on the Mazda Tribute SUV, and the Ford Fusion, Mercury Milan, Ford Five Hundred and Mercury Montego sedans, plus the Ford Edge and Lincoln MKX crossover vehicles. Ford's U.S. HEV volume for the 2005 model year was over 10,000 units and has almost doubled in 2006, and we have over 130 hybrid-related U.S. patents issued or pending.

Expansion of our hybrid offering is clearly an important part of our overall innovation strategy which embraces our recent commitment to increase our production capacity to up to 250,000 hybrids per year by 2010 and to offer hybrids on half of our Ford, Lincoln and Mercury products. Nevertheless, a key challenge facing hybrids is the incremental costs – both in terms of higher prices for components and engineering investments – that must be overcome for this technology to transition from "niche markets" to high-volume applications.

In addition to hybrids, we believe that greater use of renewable fuels like ethanol, a domestically produced renewable fuel, will help reduce reliance on foreign oil. We applaud Congress' efforts that resulted in the Energy Policy Act of 2005, as well as the President's recent commitment to address our nation's addiction to oil.

Ford has been building flexible fuel vehicles (FFVs) for over a decade, and we are an industry leader in this technology. These "FFVs" are capable of operating on up to 85% ethanol, or gasoline, or any mixture in between. And all of our gasoline powered vehicles are capable of operating on 10% ethanol or "E10". FFVs are a great alternative for our customers because they provide them with an option to choose between E85 and gasoline as they desire. As ethanol production increases, driven by growing availability and demand, competitive pricing will help to lower the cost of E85 further, increasing its use as well as demand for FFVs.

While I'm talking about FFVs, let me clear the air about what it takes to make an FFV.

We've heard from many people that all it takes to make a FFV is "a little tweak to the chip that runs the engine". I really wish it was that simple – but it's not. Because ethanol is a unique fuel with unique properties, fuel tanks with low permeation characteristics are required. They also require a special fuel pump and fuel lines to deliver the fuel to the engine. Unique injectors introduce the fuel into the engine where special calibrations programmed into the on-board computer determine how much ethanol is in the fuel and how best to set spark timing and fuel flow. And because there is more than one fuel calibration within an FFV, costly development and certification testing is doubled. Many of the FFV parts and processes are patented by Ford and are the result of innovative ideas by our best engineers, and we're proud of them. Nevertheless, making an FFV is a significant investment for auto manufacturers.

In 2006, Ford Motor Company will produce 250,000 FFVs and by the end of this year, we will have placed a total of nearly 2 million FFVs on America's roads, including America's best selling vehicle -- the (5.4L) Ford F-150.

As a whole, the U.S. automakers will have produced a total of nearly 6 million vehicles. If all of these vehicles were operated on E85, over 3.6 billion gallons of gasoline a year could be displaced. That's like saving a full year of gasoline consumption in a state like Missouri or Tennessee.

And we are not stopping there. Earlier this year we, unveiled the Ford Escape Hybrid E85 research vehicle which marries two petroleum-saving technologies – hybrid

electric power and E85 flexible-fuel capability. Though there are many technical and cost challenges to address, we believe that if just 5% of the U.S. fleet were powered by E85 HEVs, oil imports could be reduced by about 140 millions barrels a year.

Unfortunately there is a problem. Even though the volume of E85 vehicles continues to grow rapidly, there are less than 700 E85 fueling stations in the U.S. – and that's out of over 170,000 retail gasoline fueling stations nationwide. For ethanol to compete as a motor fuel in the transport sector and play an increasingly significant role addressing our nation's energy concerns, we need strong, long-term focus on policies that increase U.S. ethanol production and accelerate E85 infrastructure development. At the same time, as the President pointed out in the State of the Union address, we need national research efforts to pursue producing ethanol from more energy-efficient cellulosic materials like rice straw, corn stover, switch grass, wood chips or forest residue.

Ford is also working on advanced light duty diesel engines. Today's clean diesels offer exceptional driveability and can improve fuel economy by up to 20-25%. This technology is already prevalent in many markets around the world – nearly half of the new vehicles sold in Europe are advanced diesels – and Ford continues to accelerate our introduction of diesel applications in these markets. There are, however, many hurdles that inhibit wide scale introduction of this technology in the U.S. We are working to overcome the technical challenges of meeting the extremely stringent Federal and California tailpipe emissions standards, and to address other issues such as fuel quality, customer acceptance and retail fuel availability.

Looking to the future, we are working on what we think is an important transitional technology to sustainable transportation – hydrogen-powered internal combustion engines. Ford is a leader in this technology. We think it's a "bridge" to the development of a hydrogen infrastructure and, ultimately, fuel cell vehicles, and we are in the process of developing hydrogen powered E450 H2ICE shuttle buses for fleet demonstrations in North America starting later this year.

Even further down the road, hydrogen powered fuel cells appear to be another promising technology for delivering sustainable transportation. Hydrogen can be derived from a wide range of feedstocks to increase energy diversity, and fuel cells are highly energy-efficient and produce no emissions. Our Ford Focus Fuel Cell vehicle is a state-of-the-art, hybridized fuel cell system – sharing much of the same hybrid technology we developed for our Escape Hybrid SUV. We have already placed a small fleet of these vehicles in three U.S. cities as part of the U.S. Department of Energy's hydrogen demonstration program collecting valuable data.

As you can imagine, the R&D investment that goes with all this work is a very big number -- certainly in the billions, not the millions -- and it will only grow in the future. Many of our competitors and suppliers are also investing heavily. But there is only so much we can achieve without the help of others outside our industry. We need an integrated approach.

It is clear that the solution to the energy issues associated with road transport will need to come from advances in fuels as well as vehicle technology. We need the oil industry to endorse an Integrated Approach here in the U.S., just as they are beginning to do with automakers and government officials in Europe. We at Ford are clearly excited about the potential role of renewable fuels. However, the fact is that without the whole-hearted involvement of the fuel industry, we cannot move forward far enough or fast enough. We obviously need key partners like the oil industry to invest in developing and marketing renewable fuels like E85 – and we need it to do so now and rapidly. We fully support government incentives to encourage the industry or others to accelerate this investment.

There is a great deal that policy makers can do at all levels as well. We would like to see more R&D support for vehicle technologies and renewable fuels. Government incentives for advanced technology vehicles and E85 infrastructure can accelerate the introduction of these vehicles and fuels into the marketplace. Government must play a critical role to promote U.S. innovation and can do so by approving a seamless extension of the R&D tax credits and enhancing the level of credit for a broad range of energy efficient technologies and energy security initiatives.

We would also like to see greater investment in improved road traffic management infrastructure in order to reduce congestion and save fuel. According to the American Highway Users Alliance, about 5.7 billion gallons of fuel are wasted annually due to

congestion. Effective traffic light synchronization is a good example of a change that could lead to big reductions.

There is also a role for government in educating the public on how to drive in an energy efficient manner. In the end, it will ultimately be the size of the car park, and consumers' choices of vehicles, how many miles they drive, and driving behaviors that will determine how much motor fuel we consume. A person who drives in an energy-conscious way – by avoiding excessive idling, unnecessary bursts of acceleration and anticipating braking – can enjoy much better fuel consumption today. And government can play a key role to raise public awareness. We believe that awareness is a simple and effective early step which is why we have introduced driver training programs in Europe and recently developed on-line training for all Ford Motor Company employees.

Consistent implementation of an Integrated Approach will allow us to achieve much more in a shorter timeframe and at a significantly lower cost than if each stakeholder were to pursue its own agenda in isolation, however well-intentioned they might be. The challenges are considerable but not insurmountable, and there is an enormous amount we can achieve if we act together in an integrated manner.

We have to ensure that our business is sustainable by making vehicles that continue to meet the changing needs of the 21st century. That's a responsibility we owe to our customers, shareholders and our employees. But at another level, all of us have the

opportunity to do something about energy independence – and that's a responsibility we owe future generations.

Thank you again for the opportunity to address the Committee.

## ***One Page Summary of Major Points***

- Ford believes that our nation's energy challenges can only be properly addressed by an *Integrated Approach*: that is, a partnership of all stakeholders which includes the automotive industry, the fuel industry, government, and consumers. The truth is that we must all accept that these are long-term challenges and that we are all part of the solution.
- Ford is working to accelerate the commercial application of all areas of advanced vehicle technologies, including hybrids, flexible fuel vehicles, advanced clean diesels, hydrogen-powered internal combustion engines and fuel cell vehicles.
- Ford is the only American auto company with full hybrid vehicles on the road today and we plan to increase our production capacity to up to 250,000 hybrids per year by the end of the decade.
- Ford is also leading the way in vehicles operating on renewable ethanol – putting up to 250,000 ethanol-capable vehicles on the road this year and working to develop ethanol infrastructure.
- Ford Escape Hybrid E85 is the world's first ethanol-fueled hybrid, a research project that combines hybrid and FFV technology to provide an innovative solution to U.S. national energy concerns.
- If the nearly 6 million FFVs that will be on the roads by the end of this year were operated on E85, over 3.6 billion gallons of gasoline could be displaced.
- For ethanol to compete as a motor fuel in the transport sector and play an increasingly significant role addressing our nation's energy concerns, we need a strong, long-term focus on policies that increase U.S. ethanol production and accelerate E85 infrastructure development.
- We think hydrogen internal combustion engines are a "bridge" to the development of a hydrogen infrastructure and, ultimately, fuel cell vehicles, and we are in the process of developing hydrogen powered E450 H2ICE shuttle buses for fleet demonstrations in North America starting later this year.
- Further down the road, hydrogen powered fuel cells appear to be another promising technology. Ford has placed a small fleet of hydrogen fuel cell vehicles in three U.S. cities as part of the U.S. Department of Energy's hydrogen demonstration program collecting valuable data.
- Government must play a critical role to promote U.S. innovation and can do so by approving a seamless extension of the R&D tax credits and enhancing the level of credit for a broad range of energy efficient technologies and energy security initiatives.